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(FILE 'HOME' ENTERED AT 15:54:20 ON 20 AUG 2003)

FILE 'CA' ENTERED AT 15:54:29 ON 20 AUG 2003

L1 2030 S COTRELL OR COTTRELL  
L2 20 S (COTRELL OR COTTRELL) (3A) CURRENT  
L3 55 S L1 AND CHRONOAMPER?  
L4 1 S L1 AND BIOSEN?  
L5 66 S L2-4

=> d bib,ab 1-66 15

L5 ANSWER 17 OF 66 CA COPYRIGHT 2003 ACS on STN  
AN 129:221129 CA  
TI Short-Term **Chronoamperometric** Screening of Chlorpromazine-Package Interactions  
AU Sarsfield, Beth A.; Maloy, J. T.  
CS Department of Chemistry, Seton Hall University, South Orange, NJ, 07079, USA  
SO Journal of Pharmaceutical Sciences (1998), 87(9), 1130-1137  
AB A new electroanal. method has been developed to measure and predict solute sorption interactions with solid surfaces. By maximizing surface-to-vol. ratios, this method significantly reduces the study time of drug-package interactions and allows prediction of possible long-term effects. **Chronoamperometry** expts. were run in 40  $\mu$ L drops of soln. contg. drug placed on a solid substrate disk of about 7 mm diam. in a sample cell designed to accommodate a miniaturized three-electrode setup. Logarithmic current signatures obtained by computing  $\Delta(\ln i)/\Delta(\ln t)$  were used to define the exptl. conditions necessary to avoid the kinetic complications of chlorpromazine oxidn. in the interpretation of the results of the **chronoamperometric** anal. Results of sorption studies of chlorpromazine to glass, polypropylene, high d. polyethylene, poly(ethylene terephthalate), ethylene vinyl acetate, and poly(vinyl chloride) are presented. The small vol. sorption expts. demonstrated that chlorpromazine interacts most quickly with PVC and HDPE and least with glass and polypropylene. Long term stability tests confirmed these predictions, thereby indicating that the small vol. method makes drug-package interaction studies feasible in early development. The generation and anal. of  $\Delta(\ln i)/\Delta(\ln t)$  signature curves extends the usefulness of the electroanal. method to other systems by accurately identifying the appropriate time domains for steady state or **Cottrell** behavior.

L5 ANSWER 23 OF 66 CA COPYRIGHT 2003 ACS on STN  
AN 126:52089 CA  
TI Necessity of CO-Free Pt Sites for the Electrooxidation at Low Potentials of Dissolved CO on Polycrystalline Pt  
AU Couto, A.; Perez, M. C.; Rincon, A.; Guiterrez, C.  
CS Instituto de Quimica Fisica Rocasolano, C.S.I.C., Madrid, 28006, Spain  
SO Journal of Physical Chemistry (1996), 100(50), 19538-19544  
AB The authors have studied the effect of several exptl. variables (CO admission time, bubbling rate of CO, and magnetic stirring of the electrolyte) on the electrooxidn. at low potentials of dissolved CO on Pt. Although this electrooxidn. was affected by changes in the said variables, in all cases it was always accompanied by the presence in the same potential range of a hump of chemisorbed CO (here designated as CO(1)) in parallel CVs recorded in the absence of dissolved CO and whose charge was ~15% of a monolayer of chemisorbed CO. Since this hump of chemisorbed CO(1) preceded the main peak of electrooxidn. of chemisorbed CO, electrooxidn. of the dissolved CO takes place only on this 15% of the Pt surface free from

chemisorbed CO(1). The stationary currents, the peak **currents**, and the **Cottrell** plots of dissolved CO electrooxidn. were in good agreement with those calcd. for a wholly active surface. The only possible explanation of this behavior is that the CO(1)-free Pt sites act as an ensemble of microelectrodes, so that the overlap of their hemispherical diffusion layers yields the same c.d. as a conventional electrode. Actually, both plots of peak potential vs. the logarithm of the sweep rate and of peak c.d. vs. the square root of the sweep rate yielded the linear behavior expected of conventional electrodes, which shows that the time necessary for both electrooxidn. of the chemisorbed CO(1) and for the said overlap was negligible for sweep rates up to 10 V s<sup>-1</sup>. From this an upper value of ~3  $\mu\text{m}$  for the diam. of the CO-free patches was estd.

L5

ANSWER 27 OF 66 CA COPYRIGHT 2003 ACS on STN

AN

124:214430 CA

TI

A new approach to the recording and evaluation of linear sweep and cyclic voltammetric curves

AU

Kadar, Mihaly; Simon, Peter; Farsang, Gyorgy

CS

L. Eotvos University, Department Inorganic and Analytical Chemistry, Budapest, 1578, Hung.

SO

Analytical Methods & Instrumentation (1995), 2(4), 176-81

AB

A novel polarization method, evaluation by digital data collection and processing with special software are described for two transient voltammetric techniques, linear sweep voltammetry (LSV) and cyclic voltammetry (CV). By using the elaborated methods the proper charging current elimination is provided by digital subtraction. However, application of the described polarization and data processing method allows the accurate evaluation of LSV and CV curves by taking **Cottrell**-type decay **current** transients into consideration, as is generally accepted in the case of analog instrumentation and low rates of polarization. The method can be used advantageously when the techniques concerned are carried out with ultramicro electrodes which allow the application of high rates of polarization; because of this neither the recording nor the evaluation methods elaborated mainly for analog instrumentation could not be used at all. The method described is limited in its application when either the electrode surface area is irreproducible or the Faraday/charging current ratio becomes too poor at high rates of polarization.

L5

ANSWER 28 OF 66 CA COPYRIGHT 2003 ACS on STN

AN

124:17515 CA

TI

Theoretical consideration concerning diffusion coefficient measurements by potential step **chronoamperometry** for insertion compounds

AU

Hibino, Mitsuhiro; Kudo, Tetsuichi

CS

Inst. Ind. Sci., Univ. Tokyo, Tokyo, 106, Japan

SO

Denki Kagaku oyobi Kogyo Butsuri Kagaku (1995), 63(11), 1040-5

AB

The diffusion coeff. of inserted ions in a host compd. is often detd. by the potential step method, assuming that the induced transitional **current** shows a **Cottrell**-type dependency. Theor., however, such a dependency does not necessarily hold for the usual setup of measurements, esp. when a sample insertion compd. has considerable resistivity. The authors derive, as strictly as possible, a theor. I-T relation compatible with a situation for usual measurements. The **Cottrell** equation is a special case of the relation thus derived.

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ANSWER 29 OF 66 CA COPYRIGHT 2003 ACS on STN

AN

121:276164 CA

TI

**Biosensing** meter with fail/safe procedures to prevent erroneous indications

IN

White, Bradley E.; Parks, Robert A.; Ritchie, Paul G.; Svetnik, Vladimir

PA Boehringer Mannheim Corp., USA  
SO U.S., 11 pp.  
PI US 5352351 A 19941004 US 1993-73180 19930608  
PRAI US 1993-73180 A 19930608

AB A **biosensing** meter receives a sample strip that includes elec. isolated sense and excitation electrodes bridged by a reaction zone. When a drop of biol. sample fluid is placed in the reaction zone, a plurality of fail/safe tests are performed. A drop-size test is performed by a circuit that detects the size of the drop placed in the reaction zone. The circuit both detects that a drop has been placed in the reaction zone and further measures a test current level, after a delay, to det. that the drop size is sufficient to enable hydration of reactants in the reaction zone. Subsequently, during the reaction, a delta current change is measured at succeeding sample time. This test measures the difference between succeeding current samples during a measurement time. If each succeeding sample is not less than preceding sample by a delta value, a detn. is made that the current is not monotonically decreasing and the test is aborted. At the termination of the measurement time, a current sum test is performed wherein a processor calcs. a linear sum of all sample test currents and calcs. a ratio between that sum and the last current sample. If that ratio matches a pre-calcd. const. for the **Cottrell** relationship, then it is known that the measurement values exhibit the **Cottrell** relationship. Diagrams of the app. are included.

L5 ANSWER 30 OF 66 CA COPYRIGHT 2003 ACS on STN

AN 119:103782 CA

TI Determination of the diffusion coefficient of oxygen in sodium chloride solutions with a transient pulse technique

AU A.J. van Stroe; Janssen, L. J. J.

CS Department of Instrumental Analysis, Faculty of Chemical Engineering, Eindhoven University of Technology, P.O. Box 513, 5600 MB, Eindhoven, Neth.

SO Analytica Chimica Acta (1993), 279(2), 213-19

AB An accurate and rapid method for detg. the diffusion coeffs. of electrochem. active gases in electrolytes is described. The technique is based on **chronoamperometry** where transient currents are measured and interpreted with a **Cottrell**-related equation. The diffusion coeffs. of oxygen were detd. for 0.085 - 0.846 M NaCl solns. at 20-40°C. A relationship for the diffusion coeff. of oxygen as a function of temp. is given for the several NaCl concns.

L5 ANSWER 35 OF 66 CA COPYRIGHT 2003 ACS on STN

AN 114:70975 CA

TI Program in TURBO PASCAL for applications using electroanalytical devices

AU Wring, Stephen A.; Hart, John P.; Thompson, John F.; Birch, Brian J.

CS Sci. Dep., Bristol Polytech., Bristol, BS16 1QY, UK

SO Analytical Proceedings (1990), 27(8), 209-11

AB The TURBO PASCAL program described may be applied to investigations involving the **Cottrell** equation and can be implemented with the aid of an inexpensive A/D - D/A converter in conjunction with an IBM PC-XT compatible computer. Using the computer-controlled potentiostat the effective working areas were detd. for a glassy carbon electrode and of several disposable screen-printed graphite electrodes. Using the screen-printed electrodes the no. of electrons involved in the oxidn. of ascorbic acid was calcd. to be 2.1; this again is close to the theor. value of 2.

L5 ANSWER 37 OF 66 CA COPYRIGHT 2003 ACS on STN

AN 112:187743 CA

TI Effect of uncompensated resistance on large-amplitude **chronoamperometric**

experiments

main mic TP 250, F5  
AU Richtering, Werner; Doblhofer, Karl  
CS Fritz-Haber Inst., Max-Planck Ges., Berlin, D-100, Fed. Rep. Ger.  
SO Electrochimica Acta (1989), 34(12), 1685-8  
AB The influence of uncompensated soln. resistance in large-amplitude potential step **chronoamperometry** involving reversible redox systems was investigated. By means of addnl. external resistors, the system-imminent resistance could be deliberately changed. The obsd. current-transients show significant deviations from the ideal "**Cottrell**" behavior. It is shown by means of digital simulation expts. that already small uncompensated resistance values give rise to distorted current-transients particularly in systems with high charging or faradaic currents. This effect manifests itself in particular in electrochem. reactions on polymer-coated electrodes.

L5 ANSWER 38 OF 66 CA COPYRIGHT 2003 ACS on STN

AN 112:147760 CA

TI Voltammetric measurement of ultraslow diffusion rates in polymeric media with microdisk electrodes

AU Longmire, M. L.; Watanabe, M.; Zhang, H.; Wooster, T. T.; Murray, Royce W.

CS Kenan Lab. Chem., Univ. North Carolina, Chapel Hill, NC, 27514-3290, USA

SO Analytical Chemistry (1990), 62(7), 747-52

AB Cyclic voltammetry and **chronoamperometry** were used in conjunction with microdisk electrodes in polymeric solvents to measure diffusion coeffs. of ferrocene redox solutes down to 10-12 cm<sup>2</sup>/s. Exptl. manipulation of the parameter  $\tau$  ( $\tau = 4Dt/r^2$ ) results in diffusion profiles dominated by radial diffusion, linear diffusion, or a combination of the two. In the former two cases, adherence to the steady-state current equation for a microdisk and the **Cottrell** equation, resp., was obsd. Under conditions of mixed contribution, evaluation of diffusion coeffs. was based on comparison of exptl. and simulated current-time curves. Generally, diffusion coeffs. >10-7 cm<sup>2</sup>/s were evaluated from steady-state potential sweeps. Diffusion coeffs. <10-11 cm<sup>2</sup>/s could be evaluated by a std. **Cottrell** anal. Values in the "transition region" were evaluated from the slope of nonzero intercept **Cottrell** plots. A numerical guideline, based on  $\tau$ , is presented.

L5 ANSWER 44 OF 66 CA COPYRIGHT 2003 ACS on STN

AN 108:127824 CA

TI A new microchemical approach to amperometric analysis

AU Talbott, Jonathan; Jordan, Joseph

CS Dep. Chem., Pennsylvania State Univ., University Park, PA, 16802, USA

SO Microchemical Journal (1988), 37(1), 5-12

AB **Cottrell chronoamperometry** of metabolites relies on a scheme that incorporates dual specificity safeguards of enzymic catalysis and controlled potential electrolysis. Relevant methodol. principles are illustrated by the selective oxidn. of  $\beta$ -D-glucose with benzoquinone. Gluconic acid yields of 99.9% were attained in the presence of glucose oxidase. Concomitantly, equiv. amts. of benzoquinone were reduced to hydroquinone, which conveniently was quantitated in quiescent solns., at stationary Pd thin-film anodes. Sample sizes of 25  $\mu$ L were used, documenting microclin. applicability in such areas as blood glucose monitoring by diabetics.

L5 ANSWER 48 OF 66 CA COPYRIGHT 2003 ACS on STN

AN 104:97908 CA

TI Electrochemical oxidation of organic molecules at a thin polypyrrole film electrode

AU Sundaresan, N. S.; Santhanam, K. S. V.

CS Chem. Phys. Group, Tata Inst. Fundam. Res., Bombay, 400 005, India

SO Indian Journal of Technology (1986), 24(1), 11-16

AB The electrochem. oxidn. of hydroquinone (H<sub>2</sub>Q), catechol, N,N,N',N'-tetramethyl-p-phenylenediamine (TMPD) and ferrocene (FC) was studied at thin polypyrrole film electrodes ( $\Gamma = 1.49 \times 10^{-7}$  equiv/cm<sup>2</sup>; n = 2.2) using cyclic voltammetry and **chronoamperometry**. The expts. were carried out in anhyd. MeCN contg. Bu<sub>4</sub>NClO<sub>4</sub> as the supporting electrolyte. The oxidn. of H<sub>2</sub>Q occurs with E<sub>pa</sub> = 1.20 V and E<sub>pc1</sub> = 0.50 V, E<sub>pc2</sub> = -0.62 V; that of catechol with E<sub>pa</sub> = 1.17 V and E<sub>pc1</sub> = 0.30 V; TMPD with E<sub>pa</sub> = 0.40 V, E<sub>pc</sub> = 0.15 V; and FC with E<sub>pa</sub> = 0.37 V, E<sub>pc</sub> = 0.27 V all vs. the Ag wire quasi ref. electrode. The electrostatic binding of quinone which was shown earlier to occur at a thick film electrode ( $\Lambda = 2.57 \times 10^{-6}$  equiv/cm<sup>2</sup>; n = 2.2) upon oxidn. of H<sub>2</sub>Q or catechol was also examd. at this thin film electrode. At thick films the binding of the oxidn. product is indicated by repetitive cycling of potential between 0 V and past the anodic peak which results in the complete disappearance of the anodic peak. Comparable results were obtained at a thin film electrode and the binding reduces the anodic peak current to ~60% of its original value. The **chronoamperometric** behavior in the above oxidns. was also studied. The plots of i vs. t<sup>-1/2</sup> were linear indicating a **Cottrell** behavior. The cyclic voltammetric and **chronoamperometric** results indicate that (a) the polymer is fairly porous, and (b) there is an efficient conduction mechanism operating in the electrochem. of polypyrrole films.

L5 **ANSWER 51 OF 66** CA COPYRIGHT 2003 ACS on STN

AN 100:199704 CA

TI **Cottrell** filtration: removal of extraneous currents from a faradaic signal

AU Hempstead, Michael R.; Oldham, Keith B.

CS Trent Univ., Peterborough, ON, Can.

SQ Journal of Electroanalytical Chemistry and Interfacial Electrochemistry (1984), 162(1-2), 1-12

AB The faradaic current from a Cottrellian expt. can often be obscured by other currents arising from extraneous sources. The operation of **Cottrell** filtration is developed and simulation studies are presented which illustrate the success of this filter for the removal of a variety of plausible extraneous currents.

=> log y

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